Analytical Chemistry

THE LINK BETWEEN FINE PARTICULATE AIR POLLUTION AND ASTHMA IN CHILDREN

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Population growth and the proliferation of industrialized urban areas throughout the world have led to an increase in atmospheric concentration of traffic and industry related pollutants including fine particulates. As a result, a dramatic increase of children suffering from bronchial asthma has been observed in some areas. Children are especially at risk because they have a proportionally higher air intake than adults due to their lower body weight. In addition children spend more time outdoors. The most common urban air pollutants are nitrogen oxides (NOx), ozone (O_3), sulfur dioxide (SO_2) and fine particulate matter ($PM_{2.5}$). NO_2 is produced mainly via fossil fuel combustion and is a precursor species of photochemical smog aiding in the formation of ozone. Ozone interferes with human health by reducing the lung function and increasing the risk of respiratory inflammation. Coughing, chest pain and nausea are often the result. Besides ozone, fine particulate matter below 2.5μm is of growing concern in metropolitan areas. It can be inhaled deeply into the lungs and toxic species associated with it can be deposited in the lung tissue and eventually might reach the blood stream. In the present study we compare a variety of cities around the globe with respect to particulate air pollution and asthma based on literature published about this subject. Most of the cities are located in a subtropical or tropical environment, have a population of more than 5 million and have reported elevated asthma rates in children.